

WHAT IS CLAIMED IS:

1. A method for post-treating a dry-etched metal film, said dry-etched metal film comprising an unetched portion covered by a photoresist and an etched portion exposed from said photoresist and having thereon an etching by-product, said method comprising steps of:

using a stripping agent to remove said photoresist on said unetched portion, while reacting said stripping agent with said etching by-product to form a passivation layer on said exposed metal film; and

using a washing agent to remove said passivation layer after said photoresist is removed.

2. The method according to claim 1 wherein said metal film is an aluminum-based film.

3. The method according to claim 2 wherein said aluminum-based film is made of a material selected from one of aluminum and aluminum alloy.

4. The method according to claim 2 wherein said etching by-product is aluminum chloride (AlCl_x).

5. The method according to claim 1 wherein said passivation layer is substantially non-reactive to water.

6. The method according to claim 1 wherein said stripping agent is monoethanolamine (MEA).

7. The method according to claim 6 wherein said washing agent is isopropyl alcohol (IPA), water or a combination thereof.

8. The method according to claim 1 being substantially performed immediately after said dry-etched metal film is formed.

9. The method according to claim 1 further comprising a primary treatment step before the step of said stripping step, wherein said primary treatment step

is selected from a group consisting of carbon tetrafluoride/oxygen (CF_4/O_2) plasma treatment, gaseous water/oxygen ($\text{H}_2\text{O}(\text{g})/\text{O}_2$) plasma treatment, hydrocarbonfluoride ($\text{C}_x\text{H}_y\text{F}_2$) deposition plasma treatment, ashing treatment and hot water rinse treatment.

10. A method for dry etching a metal film, said method comprising steps of:
providing a substrate with a metal film thereon, said metal film having a first portion covered by a photoresist and a second portion uncovered by said photoresist;
using a dry etchant to etch off said second portion;
using a stripping agent to remove said photoresist on said first portion and simultaneously form a water-insoluble passivation layer on a third portion of said etched metal film exposed from said photoresist; and
using a washing agent to wash off said water-insoluble passivation layer after said photoresist is removed.

11. The method according to claim 10 wherein said metal film is made of one of aluminum and aluminum alloy.

12. The method according to claim 11 wherein said dry etchant includes one of chlorine (Cl_2) and boron chloride (BCl_3), which reacts with aluminum to form water-soluble aluminum chloride (AlCl_x) on said third portion of said metal film, and said stripping agent reacts with aluminum chloride (AlCl_x) to form said water-insoluble passivation layer on said third portion of said metal film.

13. The method according to claim 10 wherein said stripping agent is monoethanolamine (MEA), and said washing agent is isopropyl alcohol (IPA), water or a combination thereof.

14 The method according to claim 10 wherein said stripping step is substantially performed immediately after said dry etch step.

15. The method according to claim 10 further comprising an initial treatment before the step of providing said stripping agent, and said initial treatment is selected from a group consisting of carbon tetrafluoride/oxygen (CF_4/O_2) plasma treatment, gaseous water/oxygen ($\text{H}_2\text{O}(\text{g})/\text{O}_2$) plasma treatment, hydrocarbonfluoride ($\text{C}_x\text{H}_y\text{F}_2$) deposition plasma treatment, ashing treatment and hot water rinse treatment.

16. A system for performing combined etching and stripping procedures of a metal film, said system comprising:

at least one dry-etching chambers where a substrate with a metal film is dry etched to form an unetched portion covered by a photoresist and an etched portion exposed from said photoresist;

at least one stripping and cleaning chambers where said photoresist on said unetched portion is removed by a stripping agent and a passivation layer is formed on said etched portion by reacting said stripping agent; and

a transportation device transferring said substrate between said at least one dry-etching chambers and said at least one stripping and cleaning chambers.

17. The system according to claim 16, wherein each of said at least one stripping and cleaning chambers comprises a spin stripper.

18. The system according to claim 16 further comprising a load lock chamber and a transfer chamber between said at least one dry-etching chambers and said at least one stripping and cleaning chambers, and said transportation device transferring said substrate between said at least one dry-etching chambers and said at least one stripping and cleaning chambers through said load lock chamber and a transfer chamber.